

REMARKS

Claims 1-8 and 11-33 are now in the application. The recent personal interview granted the undersigned by Primary Examiner Feely is hereby noted with appreciation. The indication that claim 8 contains allowable subject matter is hereby noted with appreciation. As discussed at the interview, Claim 1 has been amended to recite "an epoxy group containing acrylic resin having a weight average molecular weight of 10,000 or higher". In view of the amendment to claim 1, claim 9 has been cancelled without prejudice or disclaimer. As pointed out at the interview, this amendment to claim 1 overcomes the cited art. Also as discussed at the interview, Claim 11 has been amended to recite "the epoxy group containing acrylic resin having a weight average molecular weight of 10,000 or higher" in place of "the high molecular polymer having an epoxy group" to render it consistent with claim 1, as amended and not to limit its scope. Claim 32, as mentioned at the interview, has been amended to use more typical Markush language for purposes of clarification and not to limit its scope. Claims 1-8, 11, 12, 14-27 and 30-33 are directed to the elected invention. Claims 13, 28 and 29 are drawn to non-elected invention and may be cancelled by the Examiner upon the allowance of the claims directed to the elected invention. The amendments to the claims do not introduce any new matter.

The objection to claim 32 has been addressed by the amendment to claim 32.

Before specifically addressing the rejections of claims over the cited art, it should be helpful to keep in mind that an important technical feature of the present invention is to add "the epoxy group containing acrylic resin" to the epoxy resin composition. The recitation in claim 1 that "no phase separation structure being observed in a matrix of a resin..." means that the resin components are completely compatible in the curable resin composition of the invention. With this technical feature, the cured product of the curable resin composition is provided with high mechanical strength, heat resistance, and moisture resistance and the like attributed to the epoxy resin as well as excellent flexibility attributed to the epoxy group containing acrylic resin. Therefore the cured product is excellent in the resistance to thermal cycles, resistance to solder reflow, and size stability and the like and provides high adhesion reliability and conduction reliability.

The epoxy group containing acrylic resin has a weight average molecular weight of 10,000 or higher. If the weight average molecular weight of the resin is lower than 10,000, the film formability of the curable resin composition becomes insufficient and the flexibility of the cured product of the curable resin composition is sometimes not sufficiently improved.

Moreover, the epoxy group containing acrylic resin has an epoxy equivalent of 200 to 1,000. If the epoxy equivalent of the resin is less than 200, the flexibility of the cured product of the curable resin composition is sometimes not sufficiently improved and on the contrary, if the epoxy equivalent of the resin is more than 1,000, the mechanical strength and the heat resistance of the cured product of the curable resin composition are not sometimes sufficiently improved.

Claims 1-7, 11, 14-24 and 31-33 are rejected under 35 USC 102(b) as being anticipated by or under 35 USC 103 (a) as being obvious over US Patent 6,309,502 to Hiroshige et al. (hereinafter also referred to as "Hiroshiga"). Hiroshiga does not anticipate and does not render obvious claims 1-7, 11, 14-24 and 31-33, as now presented.

Hiroshige suggests a conductive epoxy resin composition comprising the following components:(a) an alicyclic epoxy resin, (b) a styrenic thermoplastic elastomer with at least one epoxy group therein, (c) an ultraviolet-active cationic polymerization catalyst, and (d) a diol containing at least two hydroxyl groups therein, wherein the diol contains a fluorene moiety therein. Hiroshige states that "The styrenic thermoplastic elastomer with epoxy groups in the molecule, (hereinafter also referred to as "epoxy containing styrenic elastomer") improves the post-curing impact resistance of the epoxy resin composition over a wide temperature range, alleviates residual stress produced internally by the curing reaction, and enhances the adhesion reliability"(please see column 4, lines 42-60).

However, as mentioned at the interview, Hiroshige fails to disclose adding "an epoxy group containing acrylic resin" to the epoxy resin composition. Also, it is not obvious to employ an epoxy group containing acrylic resin from the suggestion of "the styrenic thermoplastic elastomer with epoxy groups in the molecule". Furthermore, Hiroshige never discloses the effect of adding "an epoxy group containing acrylic resin" as described above.

Also, Hiroshige does not disclose a weight average molecular weight or an epoxy equivalent for an epoxy group containing acrylic resin.

Claims 1-6, 9, 11, 12, 14-24 and 31-33 are rejected under 35 USC 103 (a) as being obvious over US Patent Application Publication 2002/0009597 to Shinozaki et al. (hereinafter also referred to as "Shinozaki") and the technical data sheet of EPON 164. The cited references do not render obvious claims 1-6, 9, 11, 12, 14-24 and 31-33.

Shinozaki suggests a connecting material, comprising the following components A to C: (A) an epoxy resin; (B) a phenol compound having two or more phenolic hydroxyl groups; and (C) a latent curing agent. The abstract and paragraph [0018] is relied upon in the Office Action. Paragraph [0018] states that "Any compound that has been used as a film forming component in a known thermosetting adhesive (such as an insulating thermosetting adhesive for an anisotropically electroconductive adhesive) can be used favorably as the epoxy resin of component A to be used in the present invention. In particular, when film formability, film strength, and other such factors are considered, two or more types of epoxy resin may be used together, such as a high molecular weight epoxy resin that is a solid at normal temperature and an epoxy resin that is a liquid at normal temperature."

Shinozaki also shows examples of solid, high molecular weight epoxy resins: phenol novolac type epoxy resins, cresol novolac type epoxy resins, epoxy resins whose main skeleton is dicyclopentadiene, bisphenol A or F type macromolecules, and these epoxy resins that have been modified. However the claims as amended to recite "an epoxy group containing acrylic resin having a weight average molecular weight of 10,000 or higher" clearly distinguish over "a high molecular weight epoxy resin that is a solid at normal temperature" according to Shinozaki et al. Shinozaki, as mentioned at the interview, never disclose the effect of adding "an epoxy group containing acrylic resin" as described above. Shinozaki do not disclose the weight average molecular weight or epoxy equivalent of the epoxy group containing acrylic resin.

The technical data sheet of EPON 164 was relied upon in the Office Action to show that cresol novolac epoxy resins have an epoxy equivalent weight of 200-240. However, the technical

date sheet of EPON 164 does not overcome the above discussed deficiencies of Shinozaki et al. with respect to rendering unpatentable the present invention.

Claims 25-27 and 30 are rejected under 35 USC 103 (a) as being obvious over US Patent 6,309,502 to Hiroshige et al. or US Patent Application Publication 2002/0009597 to Shinozaki et al. and the technical date sheet of EPON 164 in view of US Patent 6,223,429 to Kaneda et al. The cited references do not render obvious claims 25-27 and 30. Kaneda et al. do not overcome the above discussed deficiencies of Hiroshige et al., Shinozaki et al. and the technical date sheet of EPON 164 with respect to rendering unpatentable the present invention. Accordingly claims 25-227 and 30 are patentable for at least those reasons as to why claim 1 is patentable.

In view of the above, consideration and allowance are respectfully solicited.

In the event the Examiner believes another interview might serve in any way to advance the prosecution of this application, the undersigned is available at the telephone number noted below.

Please charge any fees due with this paper to our Deposit Account No. 22-0185, under Order No. 21581-00456-US from which the undersigned is authorized to draw.

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Respectfully submitted,

By: Burton A. Amernick /
Burton A. Amernick
Registration No.: 24,852
CONNOLLY BOVE LODGE & HUTZ LLP
1875 Eye Street, NW
Suite 1100
Washington, DC 20006
(202) 331-7111
(202) 293-6229 (Fax)
Attorney for Assignee